SYLVANIA

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GENERAL TELEPHONE & ELECTRONICS GT&E

SYLVANIA

SUHL

I & II

SUHL I & II

the most efficient, most complete TTL lines

Sylvania's IC pioneering has led to the highest quality and most complete lines of high-level TTL ICs in the industry. With each of 41 separate functions now available in four different versions (for a total of 164 types), SUHL I and II represent the largest high-level TTL lines on the market.

SUHL units combine propagation delay times as low as 6 nanoseconds with high noise margin, high logic swing, high fan-out, low power and high capacitance drive capability (see Table).

Advantages of SUHL integrated circuits are not limited to electrical performance characteristics. Because Sylvania provides more logic per package, you can build a computer, or other digital equipment, with 25% less packages. The savings in system cost which result from lower package count are not eaten up in higher initial costs because SUHL units are competitively priced.

Sylvania's head start in TTL integrated circuit design, manufacturing and testing is reflected in the superior quality of the SUHL lines. Patented active pull-up networks allow high output logic levels. Use of smaller device geometries not only gives better electrical characteristics, but also cuts device cost. Aluminum to aluminum ultrasonic bonding improves reliability two ways, better bonds and less heat applied to the silicon chip. Automatic testing by Sylvania's specially designed Multiple Rapid Automatic Test Of Monolithic Integrated Circuit (MR. ATOMIC) equipment insures that the units you get meet the specification to which they're bought. Tested here are all dc parameters at temperature and all switching parameters at 25° C.

The continuing leadership in TTL innovation and manufacturing exemplified by the SUHL lines makes Sylvania the prime source for high-level TTL devices.

Use Sylvania's "Hot Line" inquiry service, especially if you require full particulars on any item in a hurry. It's easy and it's free. Just fill in your name, title, company and address. We'll do the rest and see you get further information almost by return mail.

I am especially interested in ICs for the following application(s)_____

_____

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____STATE_____

SUHL I TYPICAL CHARACTERISTICS ($+25^\circ$C, $+5.0$ Volts)

Function	Type Nos.	t_{pd} (nsec)	Avg. Power (mw)	Noise Immunity $+$(volts)$-$		**Military (-55°C to $+125^\circ$C)** Prime FO / Std. FO		**Industrial (0°C to $+75^\circ$C)** Prime FO / Std. FO	
NAND/NOR Gates									
Dual 4-Input NAND/NOR Gate	SG-40, SG-41, SG-42, SG-43	10	15	1.1	1.5	15	7	12	6
Single 8-Input NAND/NOR Gate	SG-60, SG-61, SG-62, SG-63	12	15	1.1	1.5	15	7	12	6
Expandable Single 8-Input NAND/NOR Gate	SG-120, SG-121, SG-122, SG-123	18	15	1.1	1.5	15	7	12	6
Dual 4-Input Line Driver	SG-130, SG-131, SG-132, SG-133	25	30	1.1	1.5	30	15	24	12
Quad 2-Input NAND/NOR Gate	SG-140, SG-141, SG-142, SG-143	10	15	1.1	1.5	15	7	12	6
Triple 2-Input Bus Driver	SG-160, SG-161, SG-162, SG-163	15	15	1.1	1.5	15	7	12	6
Triple 3-Input NAND/NOR Gate	SG-190, SG-191, SG-192, SG-193	10	15	1.1	1.5	15	7	12	6
AND-NOR Gates									
Expandable Quad 2-Input OR Gate	SG-50, SG-51, SG-52, SG-53	12	30	1.1	1.5	15	7	12	6
Expandable Dual Output, Dual 2-Input OR Gate	SG-70, SG-71, SG-72, SG-73	12	20/gate	1.1	1.5	15	7	12	6
Exclusive-OR with Complement	SG-90, SG-91, SG-92, SG-93	11	35	1.1	1.5	15	7	12	6
Expandable Triple 3-Input OR Gate	SG-100, SG-101, SG-102, SG-103	12	25	1.1	1.5	15	7	12	6
Expandable Dual 4-Input OR Gate	SG-110, SG-111, SG-112, SG-113	12	20	1.1	1.5	15	7	12	6
Non-Inverting Gates									
Dual Pulse Shaper/Delay-AND Gate	SG-80, SG-81, SG-82, SG-83	11	30/gate	1.1	1.5	15	7	12	6
Dual 4-Input AND/OR Gate	SG-280, SG-281, SG-282, SG-283	11	38/gate	1.0	1.5	10	5	8	4
AND Expanders									
Dual 4-Input AND Expander	SG-180, SG-181, SG-182, SG-183	<1	0.9/gate	1.1	1.5				
Dual 2 + 3 Input AND/OR Expander	SG-290, SG-291, SG-292, SG-293	7	15/gate	1.0	1.5				
OR Expanders									
Quad 2-Input OR Expander	SG-150, SG-151, SG-152, SG-153	4	20	1.1	1.5				
Dual 4-Input OR Expander	SG-170, SG-171, SG-172, SG-173	3	5	1.1	1.5				
Flip-Flops									
Set-Reset Flip-Flop	SF-10, SF-11, SF-12, SF-13	20MHz*	30	1.1	1.5	15	7	12	6
Two Phase SR Clocked Flip-Flop	SF-20, SF-21, SF-22, SF-23	20MHz*	30	1.1	1.5	15	7	12	6
Single Phase SRT Flip-Flop	SF-30, SF-31, SF-32, SF-33	15MHz*	30	1.1	1.5	15	7	12	6
J-K Flip-Flop (AND Inputs)	SF-50, SF-51, SF-52, SF-53	20MHz*	50	1.1	1.5	15	7	12	6
J-K Flip-Flop (OR Inputs)	SF-60, SF-61, SF-62, SF-63	20MHz*	55	1.1	1.5	15	7	12	6
Dual 35MHz J-K Flip-Flop (Separate Clock)	SF-100, SF-101, SF-102, SF-103	35MHz*	55/FF	1.0	1.5	11	6	9	5
Dual 35MHz J-K Flip-Flop (Common Clock)	SF-110, SF-111, SF-112, SF-113	35MHz*	55/FF	1.0	1.5	11	6	9	5

SUHL II TYPICAL CHARACTERISTICS ($+25^\circ$C, $+5.0$ Volts)

Function	Type Nos.	t_{pd} (nsec)	Avg. Power (mw)	Noise Immunity $+$(volts)$-$		Prime FO	Std. FO	Prime FO	Std. FO
NAND/NOR Gates									
Expandable Single 8-Input NAND/NOR Gate	SG-200, SG-201, SG-202, SG-203	8	22	1.0	1.5	11	6	9	5
Quad 2-Input NAND/NOR Gate	SG-220, SG-221, SG-222, SG-223	6	22	1.0	1.5	11	6	9	5
Dual 4-Input NAND/NOR Gate	SG-240, SG-241, SG-242, SG-243	6	22	1.0	1.5	11	6	9	5
Single 8-Input NAND/NOR Gate	SG-260, SG-261, SG-262, SG-263	8	22	1.0	1.5	11	6	9	5
AND-NOR Gates									
Expandable Dual 4-Input OR Gate	SG-210, SG-211, SG-212, SG-213	7	30	1.0	1.5	11	6	9	5
Expandable Quad 2-Input OR Gate	SG-250, SG-251, SG-252, SG-253	7.5	43	1.0	1.5	11	6	9	5
Expandable Triple 3-Input OR Gate	SG-300, SG-301, SG-302, SG-303	7	36	1.0	1.5	11	6	9	5
Expandable Dual Output Dual 2-Input OR Gate	SG-310, SG-311, SG-312, SG-313	7	30/gate	1.0	1.5	11	6	9	5
AND Expanders									
Dual 4-Input AND Expander	SG-180, SG-181, SG-182, SG-183	<1	0.9/gate	1.1	1.5				
OR Expanders									
Quad 2-Input OR Expander	SG-230, SG-231, SG-232, SG-233	2	28	1.0					
Dual 4-Input OR Expander	SG-270, SG-271, SG-272, SG-273	2	6.7	1.0	1.5				
Flip-Flops									
Dual 50 MHz J-K Flip-Flop (Separate Clock)	SF-120, SF-121, SF-122, SF-123	50MHz*	55/FF	1.0	1.5	11	6	9	5
Dual 50MHz J-K Flip-Flop (Common Clock)	SF-130, SF-131, SF-132, SF-133	50MHz*	55/FF	1.0	1.5	11	6	9	5
50MHz J-K Flip-Flop (AND Inputs)	SF-200, SF-201, SF-202, SF-203	50MHz*	55	1.0	1.5	11	6	9	5
50MHz J-K Flip-Flop (OR Inputs)	SF-210, SF-211, SF-212, SF-213	50MHz*	55	1.0	1.5	11	6	9	5

*Minimum toggle frequency   **Minimum fan-out

SUHL I & II

SUHL I

Basic NAND/NOR Gate   Basic AND-NOR Gate

SUHL II

Basic NAND/NOR Gate   Basic AND-NOR Gate

Basic NAND/NOR Gates

AND-NOR Gates

AND Expanders

OR Expanders

Non-Inverting Gates

SCHMITT TRIGGER

Flip-Flops

(14) SET$_A$		14 (K$_3$)
(1) K$_A$		13 (D.C.-RESET)
(3) C$_A$	Q$_A$(13)	12 (Q̄)
(2) J$_A$	Q̄$_A$(12)	11 (Q)
(6) J$_B$		10
(5) C$_B$	Q̄$_B$(11)	9 (D.C.-PRESET)
(7) K$_B$	Q$_B$(9)	8 (D.C.-SET)
(8) SET$_B$		